THE TRUCK CROP INSECT SITUATION, 1931.

A radio talk by C. H. Popenoe, Bureau of Entomology, delivered through WRC and 40 other radio stations associated with the National Broadcasting Company, Tuesday, April 7, 1931.

It may seem a little early to those of us in the North, at least, to begin to think about what the bugs are going to do to our spring gardens, and what we are going to do to the bugs, but even in the North, spring is just around the corner, and we'll just about have time to get our fresh bug poisons in from the seed house before we'll need them.

The dry weather last year didn't hurt the bugs as badly as it did our crops, and they will soon open the season all over the country as usual. By now, those of us living in the South and on the Pacific Coast have already had some skirmishes with the advance guard of the cutworm army, and if the weather around here is any indication, the bugs will have a good year of it. Besides, we can depend upon it that whatever the year brings us in weather, some of our insect pests will find it just to their liking, and you can bet your last nickel that they will not be slow to take advantage of the opportunit.

The insects were on earth long before man was. They have become astonishingly apt at meeting whatever comes, and it is just this readiness to meet all kinds of conditions that has put these bug racketeers in position to collect as their share of the country's prosperity more than two billion dollars worth of crops a year. Not many of us can size up two billion dollars, for we don't know what that much money looks like. But when we know that nearly every farmer in the country puts in one day's work a week raising the crops he feeds to his bug boarders, the cost is brought home to us. If our taxes were raised two billion dollars a year, every man in the country would be up on his ear about it. But we seem actually to help the bugs help themselves to our crops. Talk about gang control!

Well, what can we do about it? When the old Roman said, "In time of peace, prepare for war," he hit the nail on the head for bugs as well as for battleships. If we know just what to do to our pests when they first get to our gardens, and if we don't let them steal a march on us before we are ready for them, the battle is half won. Nearly all of them have their weak points, and it is up to us to play our heavy artillery on these weak points if we expect to hold the line against the bug legions.

The first thing we should have in mind in using insecticides is that there are two principal classes of these, and that each has its own particular field. Insects feed in two ways. Some chew up and swallow the leaves, flowers, or fruit of a plant, and have powerful jaws for the purpose. Others are fitted with hollow beaks, which they thrust well into the substance of the plant to suck the juices from beneath the skin. The sprays or dusts used to

control insects must therefore take into account the feeding habits of the particular pest against which they are applied. Plant lice, leafhoppers, and thrips cannot be killed by spraying with Paris green or calcium arsenate, although these are excellent for grasshoppers and potato bugs, since they are stomach poisons. For plant lice and leafhoppers we use contact insecticides, or those which kill by touching the insect, such as nicotine, oil emulsions, and pyrethrum. These do not have to be eaten in order to kill, as they poison the insect through its breathing system. The stomach poisons, on the other hand, are left on the surface of the leaves by the drying of the spray liquid, and are taken in by the insect along with its food.

The cutworms are out earlier than usual, and evidently liked the mild winter. Cutworms, you know, are for the most part hatched early in the fall, and go through the winter as partly grown caterpillars. By spring they are of course pretty hungry, and the little seedlings and newly set plants are just about large enough to make a good meal. The best way to keep our plants is to give these hungry pests something else to eat that will satisfy their hunger for all time. If we scatter a little poisoned bran mash around the base of each plant after setting out, or thinly along the rows of seedlings just coming up, the cutworms will have a meal that will last them the rest of their short lives.

You can make this poison mash by mixing an ounce of white arsenic or Paris green thoroughly with two pounds of dry bran. Then stir half a cup of syrup or molasses into a quart of water and use this to make a mash of the bran mixture. If you mix the mash in the morning, the poison will soak through it completely by the time you are ready to scatter it around the plants. The cutworms like it better when it is fresh, and they have a better chance to beat the birds and chickens to it if you scatter it around the plants just before dark in the evening, because most of them like to eat a late supper. And don't forget that cutworm mash will work on chickens and livestock too, if you leave any around where they can get it.

You've seen those little green and black plant lice every spring on the undersides of the leaves, and crowded on the young growing tips of almost every thing green in the garden. You'd think that they were so little and soft that they couldn't do much damage if you left them alone, and that the ladybugs and syrphus fly slugs that are always hanging around such a juicy dinner table, as well as the birds that scoop them up by the billful, would keep them within bounds. But they are stronger than they look. They have solved the problem of keeping on earth by being able to multiply so fast that they can feed every enemy and still suck the life out of our plants. An entomologist once figured out that one single aphid in the spring, in spite of their small size could leave so many descendents by fall that if all of them lived until that time they would outweigh the 400 million inhabitants of the most populous nation in the world. He wasn't far wrong either. Our best chance of beating them to our plants is to watch for the first few that show up on the new growth and start spraying with pyrethrum or nicotine before

they get going. By the time they have gathered in crowds on the leaves and stems most of their damage has been done. And don't forget that they are all females and can raise large families of their own entirely independent of male aphids, which, if there are any, do not appear on the scene until fall.

Some of us have strawberry beds, and when the first big red berries of the season are ready for our tables we feel that the hours spent in weeding and mulching have been well spent. The early berries bring a better price too, and we are likely to resent having to share them with our bug boarders. But the strawberry weevil is one little fellow that here in the East and in the South starts gathering his share while the plants are blooming, and if we don't discourage him in time, we will get only the berries he has left.

When this weevil leaves his winter quarters, he is naturally hungry, and will show where he has picnicked by leaving little ragged holes in the leaves of your berries. But it is when he makes provision for the coming youngsters that he keeps us from satisfying our appetites for fresh berries. The female has a curious way of punching an egg into each of about 150 buds and then cutting the stem of each so that it drops off as soon as it dries a little. If you count the strawberries in a box of early fruit, you will find that in this way, about a dozen lady weevils can account for a crate of early berries. You'd hardly believe it, would you? Well, if you find the early bloom rather short, and then you look at the bloom clusters if you see some of them showing the buds hanging down or cut off, you had better go after the weevils.

Mix a pound of calcium arsenate with five pounds of dusting sulphur and dust it thoroughly over the leaves and buds. This quantity should dust about an eighth of an acre.

Have you your magnesium arsenate ready for the Mexican bean beetles? The chances are that you will need it if you expect to raise any beans. Use five level tablespoonfuls to three gallons of water, and spray the undersides of the leaves. Begin when the beetles first show up in the field, and if they are quite abundant, spray two or three times, about ten days apart. If you have a market planting of beans use a pound of the magnesium arsenate to 50 gallons of water. Spraying gets them much better than dusting. And remember that any other arsenical, such as calcium arsenate, is mighty risky treatment for a field of beans.

Some of the worst names we have ever called any of our bug neighbors seem to fit the little white maggots we find in the roots of our cabbage and cauliflower plants when we pull them up to find out why they've stopped growing and are looking so sick. And there are others of the same clan that bore into the stems and roots of our young onions, and some in the South that look just like the others but go into the beans and seed potatoes before they have time to sprout so that gaps are left in the rows all over the patch. The flies that plant the seed for these maggots, just where our plants and seed

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are, look much like common house flies. The seedcorn maggot is the southern kind, and is attracted to places where green manure, fish scrap, and cotton-seed meal have been used for fertilizer. Plant the seed shallow, so that it will warm up and sprout early and the maggots may not have time to damage it. If you live in the northern states, root maggots will bother your cabbage and cauliflower. Cut three-inch squares of tarred paper, make a slit to the center of each one, and use them around the stems of your young plants when you set them out. Push them well down against the ground to keep out the fly. Or dissolve half an ounce of corrosive sublimate in five gallons of water and pour about half a teacupful around the roots of each of the plants as you set them out, and again about two weeks later. If you pour this along the row of radishes and turnips with a watering pot, it will keep these from getting maggoty too.

As to the best stomach insecticides to use for general purposes, lead arsenate and calcium arsenate can be gotten almost anywhere and either can be used as a spray or a dust. If you spray, use three teaspoonfuls to the gallon of water, or if you prefer dust, use one part of the powdered arsenical to four parts of hydrated or air slacked lime and four parts of superfine dusting sulphur. Run the mixture several times through an ordinary flour sifter to be sure that it is thoroughly mixed.

Nicotine sulphate is the most commonly used spray for sucking insects, and in small quantities is best prepared by using one to one and a quarter teaspoonfuls to the gallon of water. You can use it somewhat stronger without harm to the plants. Shave an inch cube of laundry soap into each gallon of the mixture and stir until the soap dissolves, before you spray.

Pyrethrum, sold by druggists as Persian or Dalmatian insect powder, is less poisonous than nicotine, and works quite well as a contact spray. Use an ounce of the powder to the gallon of water, or use one of the convenient commercial extracts now on the market, if you want to be sure about the strength of your solution. The powder may lose strength if kept open too long.

The United States Department of Agriculture will be glad to send you, on receipt of a letter or post card requesting it, a free copy of Farmers' Bulletin 1371, about the diseases and insects commonly found in vegetable gardens. Or, if you have insect troubles that puzzle you, write a letter to the Bureau of Entomology, United States Department of Agriculture, describing the injury to the plants and the insect doing the damage. Prepare for the summer by writing for Farmers' Bulletin 1371.
